Resistencia en serie con esferas 180kΩ

P7/05

MODEL NO: 750-300
PART NO: DS14-1760

Hipotronics inc.

applied high voltage technology for industry utilities & science

TRANSFORMADOR
50kVac/780Vac (APROX)

HIPOTRONICS, INC. Hipotronics BREWSTER, NEW YORK 10509 (914) 279-8091 / TWX: 710-574-2420

MODEL NO: 750-300
PART NO: DS14-1760

*** DANGER HIGH VOLTAGE ***

WARNING: This publication describes a product engineered and designed to supply high voltage. Accordingly, maximum safeguards have been built into the equipment and the best safety techniques possible are set forth in the unit's operating instructions. These instructions contain cautions warning the user to exercise great care in the use of certain controls and at appropraite points in the operating procedures. Despite these written warnings the operator of this equipment is nevertheless strongly advised to maintain a safety consciousness at all times. The following rules are particularly relevant and must be followed at all times:

... BEFORE CONNECTING INPUT POWER GROUND CASE.
.. BEFORE UNGROUNDING CASE DISCONNECT INPUT POWER.

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I. SCOPE

This manual describes the Hipotronics' Model 750-300, AC Dielectric Test Set. It is intended to provide a simplified reference for users of this equipment, and allow them to make use of its features quickly, safely and efficiently.

The publication contains eight (8)major sections as described below:

SPECIFICATIONS AND GENERAL DESCRIPTION which specifies the model's specifications and gives a general description of Hipotronics' AC Dielectric Test Set.

FEATURES AND OPTIONS which lists the standard features of the model plus applicable options.

CONTROLS AND INDICATORS which describes the major features of the model plus a description of the functions performed by each of the controls and indicators.

INSTALLATION AND PRE-OPERATION INSTRUCTIONS which provide step-by-step instructions for setting up the unit for operation.

OPERATION INSTRUCTIONS which provides instructions for performing insulation tests.

SPECIAL OPERATIONS which explains the procedures involved in Meter Recalibration.

TROUBLE SHOOTING GUIDE which lists recommended solutions to possible problems which may arise.

MAINTENANCE which describes methods of keeping the unit in proper working condition.

Rev. 11/8/79

II. SPECIFICATIONS AND GENERAL DESCRIPTION

AC DIELECTRIC TEST SET

MODEL NO: 750-300
PART NO: DS14-1760

SPECIFICATIONS

Input	240	V ac, 60 Hz, 65 A
Output	0-5	kV ac @ 15 A
Distortion less than 5%		
Duty	300	kVA @ 1 Hr., 200 kVA Continuous
Kilovolt Meter	0-1/2.5/5 KVAC	2% Accuracy
Current Meter	0-3.75/7.5/15 ADC	2% Accuracy
Control Size	21-1/4" x 20-1/4" x 19-1/2"	
Regulator	72"H x 42"D x 30"W	
Tank Size	60"H x 29"D	

GENERAL DESCRIPTION

Hipotronics' AC Dielectric Test Sets are ruggedly designed systems engineered especially to provide AC test power for a variety of capacitive, inductive or resistive loads. Each unit is engineered and built for a long lifetime of service.

We at Hipotronics are keeping pace with new engineering solutions and more reliable dielectric testing methods to meet the needs of industry. All of our insulation testers are conservatively designe to insure highest quality and dependability. The most advanced techniques have been used to more than comply with the growing reliability standards imposed by the industry. Also, years of engineering experience have made it possible to manufacture test sets with ease of operation and operator safety and integral consideration in every design.

Where supplied, corona free (partial discharge) units are designed for extremely low noise levels. Each high voltage component under goes the strictest processing controls employed today so that long stable operation is maintained in our AC Dielectric Test Sets.

III. FEATURES AND OPTIONS

FEATURES:

Continuously adjustable output

Continuously adjustable overload from 25-110% of rated current

"Zero Start" interlock

External interlock provisions

Triple range voltmeter, output connected

Single range current meter

Backup overload breaker

Meter recalibration potentiometers (if applicable)

HV "ON"and "OFF" pushbuttons

Indicator Pilot Lights: Main Power, Control Power, H.V. on, Intlk. Open, and Overload

OPTIONS (CHECKED IF APPLICABLE)

_____ Corona Detection Equipment

_____ Motorized Output Control, single speed

_____ Motorized Output Control with 10:1 range of Adjustment

_____ "HV On" Dwell Timer

_____ Memory KV Meter

_____ Completely Automatic Test Programming

_____ Burn Feature

_____ Tapped Secondary

_____ Test Fixtures and Jigs

_____ HV Warning System

_____ OTHER:

I iv. CONTROLS AND INDICATORS

; The functions and uses of the various controls and indicators are
(• described below.

.' MAIN POWER CIRCUIT BREAKER

f The MAIN POWER circuit breaker, installed in all units with a power
i rating above 2 kVA, supplies input power to the system. The breaker
i- serves as the primary overload protection device for the system and,
^ as such, its limitations should be noted before installing the system.
^' Each circuit breaker is rated for the input.voltage and maximum current
under normal operating conditions. Under fault conditions, the current
I input of the system may rise to many times the rated input level. For
' this reason the system must be coordinated with source power that will
f1 not supply excessive amounts of- fault currents which may cause the
circuit breaker to fail and result in serious damage to the system.

t rONTROL POWER CIRCUIT BREAKER

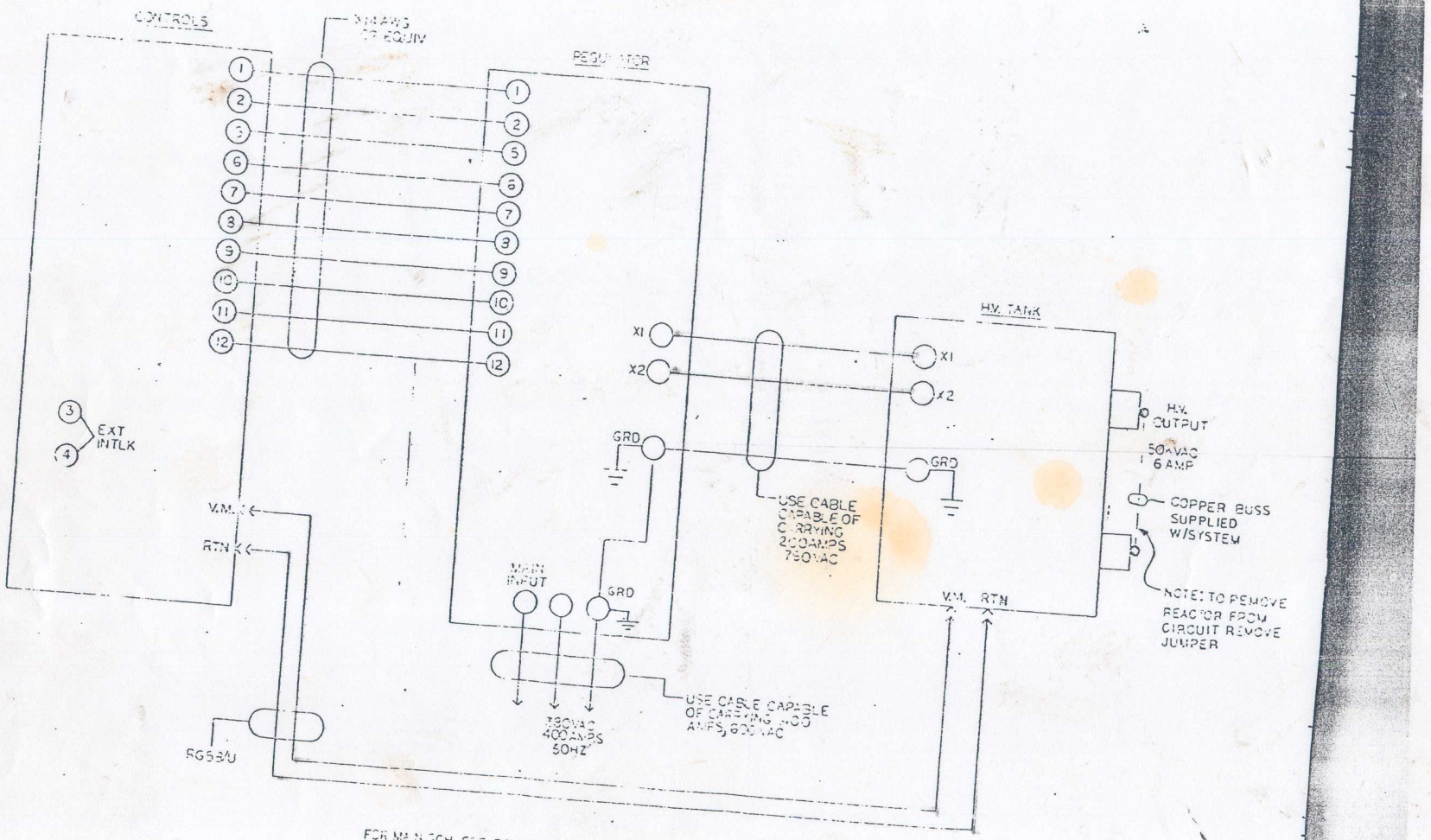
'? Thp CONTROL POWER circuit breaker, installed in all units above 5 kVA,
1 se-ves both as a switch and protection device for the control circuitry
: .All control circuitry has a maximum voltage level of 120 V ac for opera
' tor Safety.. The control power indicator will light when .the control
; power circuit breaker is energized.

RnnniPCIRCUIT BREAKER OR INTERNAL DASHPOT

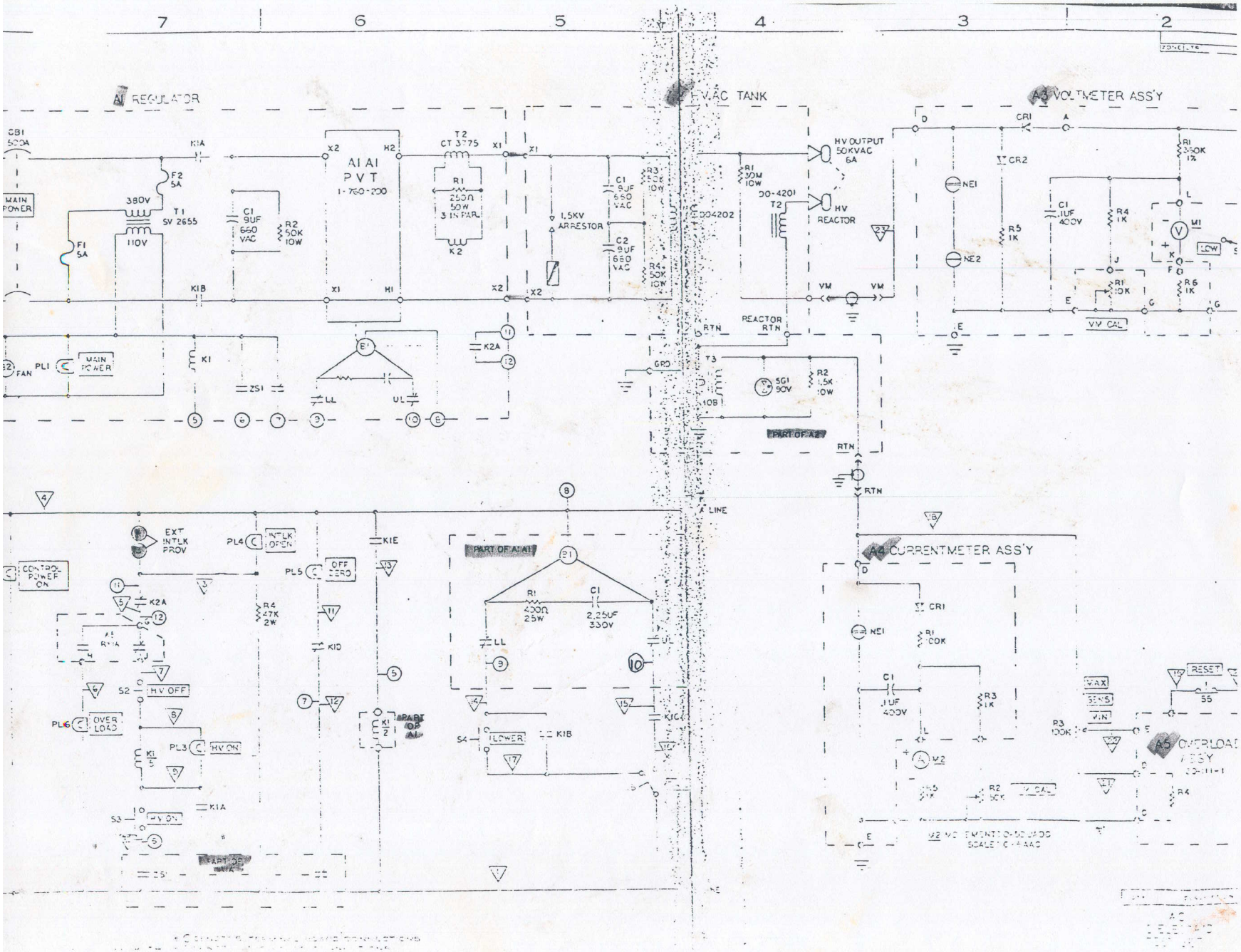
; in every system a "backup" circuit /breaker or magnetic dashpot is in-
stiled in series with the primary of the high-voltage transformer to
detect excessive current levels in the winding. The power rating of
the system determines whether a dashpot or circuit breaker will be
I used The dashpot has the added advantage of being an adjustable over-
t load'device which enables the operator to select his maximum allowable
I primary current level for each test situation. Excessive current will
I cause either device to activate and de-energize the high voltage trans-
| ' former.

I' SECONDARY CONNECTED OVERLOAD

[The secondary connected current overload circuitry serves as the first
r overload for the system. Any excessive amount of current flowing in
f 1-h.e test loou will activate --he circuit and de-energize the high voltac
: transformer.' The circuitry wil:- activate in approximately 100 u sec.
f and deactivate the system in approximately 3-10 cycles, depending on
^ the main contactor size. If an overload occurs while testing, the hig.
[voltage will be de-energized and the red indicator will light. To re
[sume testing the RESET button must be depressed and high voltage re-
f enercrized.



QTY	DESCRIPTION	PART NO	MATL OR NOTE ITEM
	INTERPANS	HIPOTRONICS	


A1 REGULATOR
H.V. TANK
A3 VOLTMETER ASS'Y
A4 CURRENTMETER ASS'Y
A5 OVERLOAD ASSY
MAIN POWER
CB1 50DA
F2 5A
F1 5A
T1 SV 2655
380V
110V
K1A
K1B
C1 9UF 660 VAC
R2 50K 10W
A1 A1 PVT 1-760-200
T2 CT 3775
R1 250Ω 50W 3 IN PAR
K2
1.5KV ARRESTOR
C2 9UF 660 VAC
R3 50K 10W
R4 50K 10W
R1 30M 10W
D30-4201
T2
HV OUTPUT 50KVAC 6A
HV REACTOR
004202
VM
REACTOR RTN
RTN
GRD
T3
SG1 90V
R2 1.5K 10W
10B
PART OF A2
PART OF A1A1
PL1
FAN
MAIN POWER
K1
ZS1
LL
UL
K2A
E1
CR1
CR2
NE1
NE2
R1 250K 1%
C1 .1UF 400V
R4 1K
R5 1K
R6 1K
R1 10K
M1
LOW
VV CAL
CONTROL POWER ON
EXT INTLK PROV
PL4
INTLK OPEN
PL5
OFF ZERO
K1E
K1D
K1C
R4 47K 2W
S2
H.V. OFF
PL6
OVER LOAD
PL3
H.V. ON
S3
S4
LOWER
K1B
R1 400Ω 25W
C1 2.25UF 330V
PART OF A1
R1 50K
C1 .1UF 400V
R3 1K
MAX
SENS
MIN
R3 100K
RESET
S5
V2
R5 1K
R2 50K
V CAL
R4
E
A
LINE

OPTIONAL CONTROLS

VARIABLE RATE OF RISE

The variable rate of rise control enables the operator to select the rate at which the output voltage will rise. The rate is adjustable over a 10:1 range.

SURGE ON

The surge on feature enables the operator to bypass the zero start interlock and turn on at a specified output voltage level. The actual output level will vary according to load conditions and the transformer impedance.

BURN

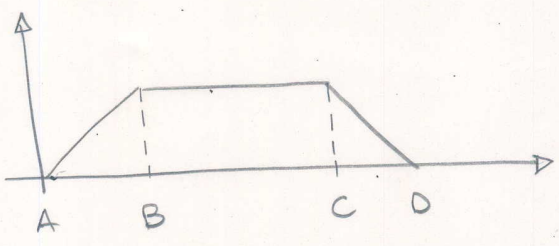
The burn feature allows the operator to burn a fault in the test sample to destruction by limiting the input current to the rated input level. The limiting of the current enables the system to power follow into the fault without tripping the overload circuitry.

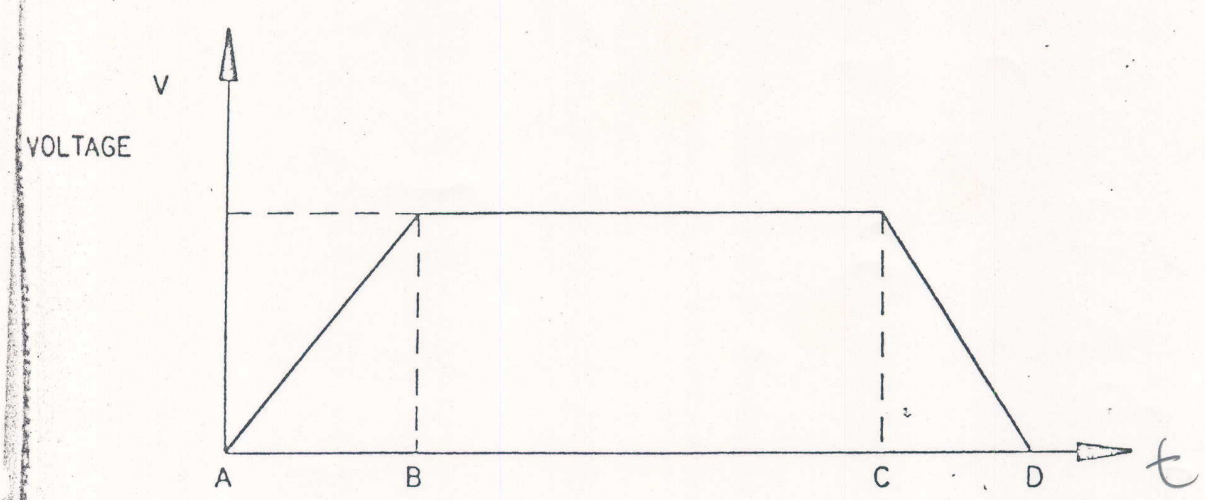
METER RELAYS

Meter relays can be used for voltage and current limitations or preselection. When an overvoltage and/or overcurrent meter relay is used as a limiting device, the corresponding indicator will light when the relay is activated and high voltage will be deactivated. When the relay is used for preselection the output level will rise no further, thus protecting the load from overvoltage or overcurrent levels. Rapid rates of rise may cause the levels to overshoot the relays. Judgment must be used when selecting the rate of rise so as to limit this overshoot by setting the relays somewhat below the desired test level.

AUTOMATIC OPERATION

The automatic mode of operation enables the operator to raise to a set level at a uniform rate of rise, dwell at a specific level for a predetermined amount of time, and return to zero at the same rate. A typical curve is shown on the following page where the above sequence is used.





Point	Time Sequence Operation
A	H.V. activated - begins to ri
B	Preset limit is reached, dwel timer turns on
C	Dwell Timer times out, voltag regulator begins to lo
D	Voltage output reaches zero,H turns off

If a failure occurs during the test time, the time at which it occurred will remain registered on the timer until the reset button is depressed.

MEMORY METER

The memory meter is used to register the voltage at which a failure in the test sample has occurred. This value will remain displayed until the RESET button is depressed.

DWELL TIMER

The dwell timer allows the operator to preselect a test duration at a specific test voltage. Most often, the timer is incorporated in an "automatic" mode of operation allowing a total test sequence to take place without excessive operations being carried out by the user. A buzzer may also be incorporated into the circuit which alerts the operator that the test time has run out.

V. INSTALLATION AND PRE-OPERATION INSTRUCTIONS.

After installation, a pre-operation test is recommended before any high voltage connections are made. This test is similar to the final test prior to shipment and assures that no shipping damage or deterioration has occurred during transit or storage.

1. Locate each piece of the system in its appropriate location observing clearances for the maximum output voltage of the system. Approximately 5 kV peak per inch can be used between smooth surfaces. Rough edges should be avoided as corona and field distortion will result causing difficulty with testing.

2. Interconnect all appropriate cables as shown on the accompanying interwiring diagram. Ensure that each piece of the system is securely grounded before installing the input cable to the power source. DO NOT CONNECT THE PRIMARY LEADS TO THE HIGH VOLTAGE TRANSFORMER.

3. Check all auxiliary interlocks to ensure that the system is secure.

4. Energize the MAIN POWER circuit breaker. The indicator will light up when the breaker is activated.

5. Energize the CONTROL POWER circuit breaker if applicable.

6. If the voltage regulator is manually driven, return it to zero by rotating the control knob counterclockwise. If the regulator is motorized and "off zero", the indicator will light until the regulator has returned to the zero position and is ready for operation.

7. Activate the "Backup" circuit breaker. Ensure that all of the safety features are now secure and the system is ready for operation.

8. Energize the High Voltage control circuitry by depressing the High Voltage "ON" button.

9. Raise the voltage control observing the output voltage of the regulator with a suitable a.c. voltmeter. The voltage should be at least 100% of the input voltage of the system.

10. Return the regulator to the zero position and de-energize the system. Connect the primary leads to the high voltage transformer.

11. Set the overload sensitivity control so that the unit trips at the desired current level. (See special operations section for details).

12. The system may now be operated at high voltage.

VI. OPERATION INSTRUCTIONS

This section provides step-by-step instructions for performing tests for the supplied system. Prior to performing any of these functions, the procedures detailed in the installation and pre-operation section must be completed. Ensure that the main circuit breaker is in the "OFF" position.

A. MANUAL OPERATION

1. Connect the low end of the test sample to ground with a conductor large enough to carry the rated output current of the system. Connect the high end of the test sample to the output bushing of the transformer. In general, aluminum or copper pipe is the easiest material to use for this purpose. A minimum size of 1 inch O.D. per 100 kV rms should be used. All surfaces must be kept smooth and free of any sharp edges.

2. Energize the MAIN POWER circuit breaker, CONTROL POWER circuit breaker, and BACKUP circuit breaker, if applicable.

3. Select the appropriate voltage and current ranges for meter readings. The ranges should be set so the levels will be in the upper 1/3 of the scale.

4. Energize the high voltage transformer by depressing the "High Voltage ON" pushbutton.

5. Raise the output voltage to the desired test level by rotating the control knob on the front panel clockwise until the specified voltage is reached. If the system has a motorized voltage regulator, the voltage can be raised by depressing the "Raise" voltage pushbutton.

6. When the test is complete return the voltage control knob to the zero position and depress the "High Voltage OFF" pushbutton, de-energizing the high voltage transformer. If the system is motorized, the "LOWER" pushbutton should be used to return the regulator to the zero position before de-energizing the system.

NOTE:

If a fault occurs while testing, the secondary connected overload circuitry will activate causing the High Voltage circuitry to be de-energized. The power control knob must be returned to the zero position and the "RESET" pushbutton depressed before activating the system again. In a motorized system the regulator will automatically return to the zero position.

B. AUTOMATIC OPERATION

1. Connect the low end of the test sample to ground with a conductor large enough to carry the rated output current of the system. Connect the high end of the test sample to the output bushing of the transformer. In general, aluminum or copper pipe is the easiest material to use for this purpose. A minimum size of 1 inch O.D. per 100 kV rms should be used. All surfaces must be kept smooth and free of any sharp edges.

2. Energize the MAIN POWER circuit breaker, CONTROL POWER circuit breaker, and BACKUP circuit breaker, if applicable.

3. Select the appropriate voltage and current ranges for meter readings. The ranges should be set so the levels will be in the upper 1/3 of the scale. SET METER RELAY RED POINTER TO DESIRED TEST LEVEL.

4. Switch the mode switch to the "AUTO" position.

5. Energize the High Voltage transformer by depressing the"High Voltage ON" pushbutton.

6. The voltage will rise at a uniform rate to the preset level. When it reaches this point the dwell timer will turn on beginning the test duration at this voltage. At the end of the prescribed time the voltage will lower at the same rate to zero and the high voltage transformer will be de-energized.

NOTE:

If a fault occurs while testing, the secondary connected overload circuitry will activate causing the High Voltage circuitry to be de-energized. The power control knob must be returned to the zero position and the "RESET" pushbutton depressed before activating the system again. In a motorized system the regulator will automatically return to the zero position.

VII. SPECIAL OPERATIONS

This section describes the step-by-step procedures required to perform special operations incidental to the major functions described in the preceding sections.

Meter Recalibration

Meters on the Hipotronics' units have been calibrated with standards traceable to national standards maintained by the National Bureau of Standards in Washington, D.C. and are certified accurate to within 2% when shipped.

Meter recalibration should be performed by the user as often as necessary to meet the requirements of each particular installation, as dictated by usage and by the user's standards for accuracy.

Access to calibration potentiometers is through the front panel holes below the meters.

Current Meter (Some units do not contain current meter recalibration provisions)

1. Ensure that the unit is properly grounded.
2. Connect a suitable 1% standard current meter between the high voltage output and ground.
3. An additional series resistor may be connected in series with the standard meter to provide better adjustment resolution while calibrating.
4. Turn on all the circuit breakers and depress the HV push-button.
5. Raise the output current to approximately two-thirds full scale on the lowest scale.
6. Adjust the front panel meter with the potentiometer labeled CM CAL to correspond to the standard meter reading. Other ranges should track within 2%.

Voltmeter

1. Ensure that the unit is properly grounded.

2. Connect a Hipotronics standard kilovoltmeter across the output of the HV transformer and set the range switch to the middle position.

3. Turn on all circuit breakers. Depress the HV ON button.

4. Raise the output voltage to approximately two-thirds full scale.

5. Adjust the front panel meter with the potentiometer labeled VM CAL to correspond to the standard meter reading.

Setting the Overload

1. Insert a resistive load simulating 10% of acceptable resistance of the test sample between the high voltage output and ground.

2. Set the SENS potentiometer to MIN.

3. Turn on the circuit breakers and depress the HV ON button.

4. Increase the voltage with the RAISE button to the desired overload current level.

5. Rotate the SENS potentiometer counterclockwise until the overload current level.

6. Depress the HV OFF button and turn OFF the circuit breakers.

7. The unit is now calibrated for a specific current level.

PROBLEM	POSSIBLE CAUSE	RECOMMENDED SOLUTION
NO MAIN POWER INDICATION	a. Faulty input connection. b. Blown fuses. c. Blown bulb.	a. Check and secure all input connections. b. Replace fuses. c. Replace bulb.
NO CONTROL POWER INDICATION	a. Faulty circuit breaker. b. Blown bulb.	a. Replace breaker. b. Replace bulb.
UNABLE TO ACTIVATE HIGH VOLTAGE	a. Open interlock system b. Open backup circuit breaker. c. Current overload activation d. Voltage regulator is off zero.	a. Check and secure all interlocks. b. Close the circuit breaker. c. Depress RESET button. d. Return regulator to the zero position.
NO HIGH VOLTAGE OUTPUT	a. Bad interconnections of HV transformer. b. No primary voltage. c. No regulator drive.	a. Check and secure all interconnecting leads. b. Visually check the main contacto for closing. c. Check the variable speed setting
NO METER READINGS Consult factory if problems not listed occur.	a. Faulty connections.	a. Check and replace interconnectin cables.

MAINTENANCE

Cleaning of the Equipment:

The painted surfaces and control panel should be cleaned with a damp cloth and a mild detergent. The solution must not come in contact with the electrical circuitry. Meter faces and acrylic parts should be cleaned with a soft cloth and a good antistatic cleanser. The high voltage contacts should be cleaned with a residue free agent such as freon or trichlorethylene. Periodically, the interior of the unit should be blown out with water free, filtered compressed air. This will prevent dust build-up and extend the operating life of the equipment.

Transformer Oil:

The HV tank oil level should be maintained. A minimum of 1" of space should be allowed from the oil level to the header for every 30" of height at 25°C. In the event oil must be added, TEXACO #55 uninhibited transformer oil or the equivalent should be used.

ASTM standards concerning oil dielectric breakdown limits should be observed. Tests should be performed at least annually using a Hipotronics liquid dielectric testers Model OC-50 or equivalent These tests should be performed by qualified personnel only as serious damage may result from contamination. Oil dielectric strength should be at least 22 kV with standard 0.1" disk electro

METER FACES: When meter acts erratically clean face with an anti static solution such as Crown TM OR Statnul TM

POTRONICS INC.

CF30-111-1
CIRCUIT DESCRIPTION
2D21 OVERLOAD BOARD

Input power is fed into terminals A and B. Terminals A and B connect to the primary of an isolation transformer which has two secondary windings. The green wire winding feeds the 6.3V filament of the 2D21 thyratron. The red wire winding powers the anode supply for the thyratron. CR1 rectifies the output of T1, producing half-wave DC voltage which when applied to the filter storage capacitor C1, produces a DC voltage of 180 to 200 V DC. The capacitor charges to the peak value of the half-wave DC, which is variable directly to line voltage, wave shape and load current.

The anode of the thyratron is connected to the DC supply thru the external reset pushbutton and the overload indicating relay RY1. The reset pushbutton connections are K and F. The relay indicating contacts go to terminals H, which is normally open, J, which is normally closed and G, which is common.

The thyratron acts like a switch to turn on the relay when it is activated. The only way a thyratron can be turned off is to remove its anode source so the reset device is needed. The 2D21 thyratron is a hydrogen filled switch tube which will trigger on a precise threshold level. This level is dependent upon the pressure of the gas which is controlled by the filament, the anode voltage and the screen grid and cathode bias levels.

The trigger level in our circuit, is when the grid (pin 1) is approximately -2V from the cathode potential. Therefore if the cathode is set for a positive 4 volts the grid will trigger when it is positive 2 volts.

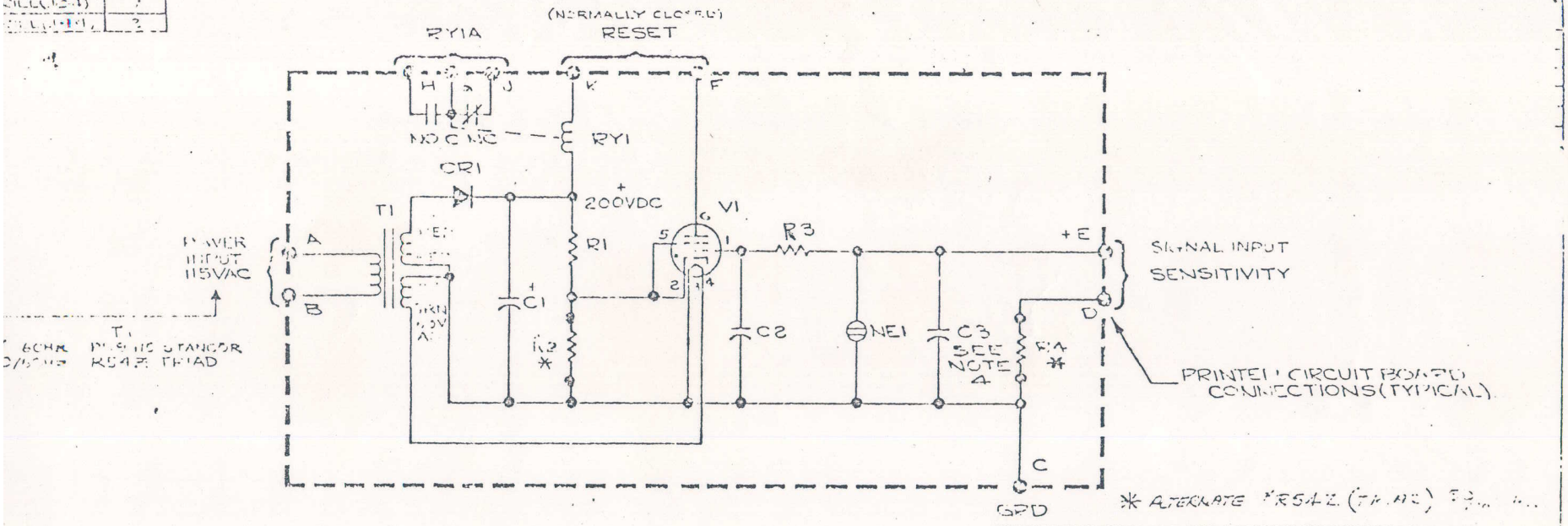
The resistor divider R1 and R2 provide the cathode bias level. Assuming the anode supply to be 200V, R1 to be 100 K ohms, and R2 to be 4 K ohms, a current thru the divider would approach 2 milliamperes producing a voltage of positive 8 volts on the cathode. The required trigger level would then be 6 volts positive.

The input to the grid is terminal E. A resistor R3 100 K ohms is used to limit grid current and to filter out unwanted noise from triggering the thyratron C2 a .01 uf capacitor is placed across the grid to ground terminal C, this capacitor is part of the input filter. A neon bulb spark gap is wired across terminal E and C to prevent the damage of any components from large transients. C3 is an optional capacitor used to provide greater filtering of input signal. The thyratron is an extremely fast overload device and will trigger on a single narrow spike of low energy, provided it exceeds the trigger voltage level.

R4 is used with an external potentiometer to provide an adjustable inpu
The arm of the pot goes to terminal E. One end of the pot goes to term
The other end of the pot is connected to a current source. The

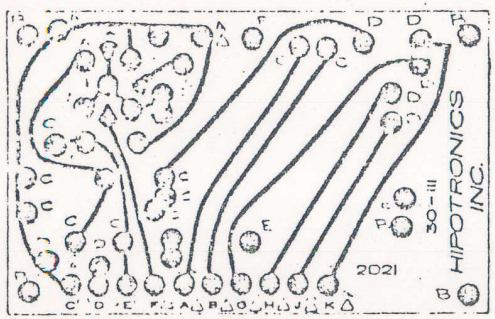
Once the thyratron fires, the grid voltage level will raise to a valu between the cathode level and the anode. The voltage will charge C2 and C3. Before the thyratron can be operated again these capacitors must be discharged. The combined resistance between the sensitivity control potentiometer and R4 discharge the capacitors. The circuit m have some resistance between terminal E and C in order to reset properly.

By connecting terminal E and D, a fixed input sensitivity is produce This input sensitivity is dependent upon the resistance of R4 and the current thru it. Another way of adjusting the sensitivity level is by adjusting R2 as described in preceding paragraphs.

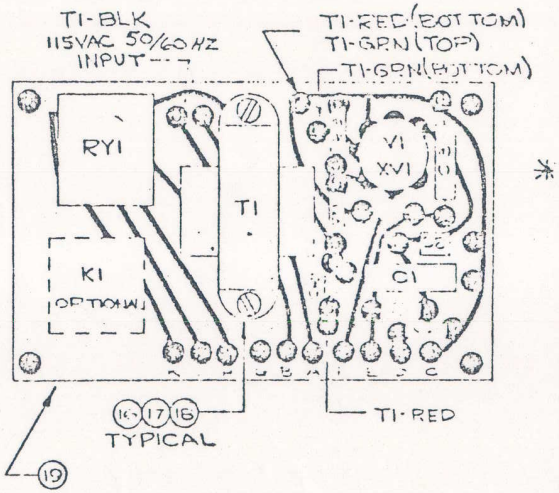


* ALTERNATE RESET (TRIAC) TYPE

COPPER SIDE



COMPONENT SIDE



QTY	DESCRIPTION	PART NO	MATL OR NOTE	ITEM
1	BOARD, FAB	F30-III-1		
2	NUT, HEX			
2	LOCKWASHER, SPLIT			
2	SCREW			
11	STAMPED IN	EYELETS		
1	TUBE SOCKET	XVI		
1	TUBE, THYRATRON	V1		
1	TRANSFORMER	T1		
1	SPDT RELAY	RY1		
1	RESISTOR	R4		
1	RESISTOR	R3		
1	RESISTOR	R2		
1	RESISTOR	R1		
1	NEON	NE1		
1	OPTIONAL	K1		
1	DIODE	CR1		
1	CAPACITOR	C3		
1	CAPACITOR	C2		
1	CAPACITOR	C1		

2D21
OVERLOAD
P.C. BOARD

HIPOTRONICS
BREWSTER, N.Y.

UNLESS OTHERWISE SPECIFIED, RESISTORS ARE 1/2W ±10%.
INSTALL ITEM 15, IN HOLES DESIGNATED BY "Δ", FROM COMPONENT SIDE.
OPTIONAL, FACTORY ADJUST. DESIGNATED BY *
MAY BE USED 400V IN HIGH CURRENT UNITS.
MAY BE OMITTED IN A.C. HV UNITS

MATL GIO GLASS EPOXY, 1/16 THK. 2 OZ COPPER BOTH SIDE
FINISH SOLDER DIP

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN INCHES DO NOT SCALE DWG TOLERANCES

FRACTIONS ± 1/64 | DECIMALS ± .005 | ANGLES ±30

DWG NO C[illegible]-III-1

RETURNED MATERIAL

If, for any reason, it should become necessary to return the equipment described in this publication to the factory, the Warranty Service Department of HIPOTRONICS must be contacted, at which time the following data must be given in order that we may identify the unit and determine the necessity for return. (Tel. 914-279-8035) MODEL, SERIAL NO. and TYPE (Part No.) is indicated on the black and silver tag affixed to the unit.

MODEL:
SERIAL NUMBER:
TYPE (Part No.):
REASON FOR RETURN:
DEFECT:
ALLEGED CAUSE OF DEFECT:

If HIPOTRONICS deems return of the unit appropriate, an "Authorization for Return" tag will be issued. This will instruct you as to the method of return. The pink copy is for your records, the hard copy to be affixed to the unit being returned. If return is not deemed advisable, other inspection arrangements will be made.

NOTE: Material received at this plant without the proper authorization shall be held as "customer's property," with no service performed until such time as the proper steps have been taken.

Your cooperation is requested in order to ensure prompt service. Thank you.

PARTS ORDERING

To order replacement parts for this unit, please refer to the Parts List contained in the pocket of this publication. The number of the specific component is required, along with the TYPE (Part No.) of the unit. The TYPE (Part No.) is indicated on your Parts List, and on the black and silver tag affixed to the unit.

PARTS LIST

MODEL NO: 750-300
PART NO: DS14-1760

A1	Subassembly, Regulator Section, Hipo
A1A1	Subassembly, PVT 1-760-200, Hipo
A2	Subassembly, H.V. Tank, Hipo
A3	Subassembly, Voltmeter, P/N 30-352, Hipo
A4	Subassembly, Current Meter, P/N 30-352, Hipo
A5	Subassembly, Overload, P/N 30-111-1, Hipo
CAB	Cabinet, 17-1/2" x 19" x 24", EES, Slope w/Desk
CB1	Circuit Breaker, 10 A, AM1-A3-A, HEINEMANN
F1	Fuse Holder, 357001, w/1A
K1	Relay, PM17AY, P&B
M1	Meter, 7045-50 uA, w/0-10/25/50 KVAC Scale, API
M2	Meter, 7045-50 uA, w/0-6 A AC Scale, API
PL1-3,5,6	Pilot Light, 75AP, w/6S6 Lamp, Drake
PL4	Pilot Light, 5100-832, w/NE51H Lamp, Drake
R1	Resistor, Pot., 10 k ohms, 2 W
R2	Resistor, Pot., 50 k ohms, 2 W
R3	Resistor, Pot., 100 k ohms, 2 W
R4	Resistor, 47 k ohms, 2 W
S1	Switch, Rotary, PA2002, CRL
S2,4,6	Switch, Pushbutton, ABB, Unimax
S3,5	Switch, Pushbutton, ABB1, Unimax

A1 REGULATOR SECTION

A1A1	Subassembly, PVT, 1-760-200, Hipo
B2	Motor, Fan, Dual, Kooltronics
CAB	Cabinet, 30" x 42" x 72"H, Hipo
C1	Capacitor, 9 uF @ 660 V ac
CB1	Circuit Breaker, 500 A, AM1-A3-A, HEINEMANN
F1,2	Fuse Holder, 2808, w/5 A, 600 V ac, Fuse
K1	Relay, (2) EG315, ASEA
K2	Relay, MKTO-2A, L.E.
PL1	Pilot Light, 75AP, w/6S6 Bulb, Drake
R1	Resistor, 250 ohms, 50 W, 3 in para.
R2	Resistor, 50 k ohms, 10 W
T1	Transformer, S/D, SV-2655A, Hipo
T2	Transformer, C.T., CT-3775, Hipo

PARTS LIST

MODEL NO: 750-300
PART NO: DS14-1760

A2	H.V. SECTION
C1,2	Capacitor, 9 uF @ 660 V ac
R1	Resistor, 30 M ohms, 10 W, 2 in series
R2	Resistor, 1.5 k ohms, 10 W
R3,4	Resistor, 50 k ohms, 10 W
SG1	Spark Gap, 90 V, Siemens
T1	Transformer, BO-4202, Hipo
T2	Transformer, Reactor, 4201, Hipo
T3	Transformer, 10B Core, Superior
	Lightning Arrestor, 1.5 KV
A3	VOLTMETER ASSEMBLY
PCB	FAB, 30-352, Hipo
C1	Capacitor, .1 uF @ 400 V
CR1,2	Diode, 1N4007
NE1,2	Neon, NE2
R1	Resistor, 360 k ohms, 1/2 W, 1%
R2	Resistor, 240 k ohms, 1/2 W, 1%
R3	Resistor, 90 k ohms, 1/2 W, 1%
R4,5,6	Resistor, 1 k ohm, 1/2 W, 10%
A4	CURRENT METER ASSEMBLY
PCB	FAB, 30-352, Hipo
C1	Capacitor, .1 uF @ 400 V
CR1	Diode, 1N4007
NE1	Neon, NE2
R1	Resistor, 100 k ohms, 1/2 W, 10%
R2,3	Resistor, 1 k ohm, 1/2 W, 10%

HIPOTRONICS

Exhibit A
SOP # 652

WARRANTY

HIPOTRONICS, INC. warrants to the original purchaser of any new merchandise that the merchandise is free from defects in material and workmanship under normal use and service for a period of one (1) year from the date of shipment. The obligation of Hipotronics, Inc. under this Warranty is limited, in its exclusive option, to repair, replace or issue credit for parts or materials which prove to be defective, and is subject to Purchaser's compliance with the Hipotronics, Inc. Warranty Claim Procedure as set forth below. The happening of any one or more of the following events will serve to void this Warranty and any defect or damage resulting therefrom is specifically excluded from Warranty coverage: (a) defects due to accident, negligence, alteration, modification, faulty installation by Purchaser or Purchaser's agents or employees, abuse or misuse; (b) attempted or actual dismantling, disassembling, service or repair by any person, firm or corporation not specifically authorized in writing by Hipotronics, Inc. (c) defects caused by or due to handling by carrier, or incurred during shipment, transshipment or other move.

This Warranty covers only those parts and/or materials deemed by Hipotronics, Inc. to be defective within the meaning of this Warranty. The liability of Hipotronics, Inc. shall be limited to the repair, replacement or issuance of credit for parts deemed defective within the meaning of this Warranty. Costs incurred by purchaser for labor or other expenses incidental to the inspection, repair, replacement or issuance of credit for such parts and/or material shall be the sole responsibility of purchaser. This Warranty shall not apply to any accessories, parts, or materials not manufactured or supplied by Hipotronics, Inc. and if, in the sole discretion of Hipotronics, Inc., Purchaser's claim relates to any materials or workmanship manufactured or performed by the supplier of a component part, or of the manufacturer of a device of which the defective part is a component, Hipotronics, Inc. reserves the right to disclaim liability under this Warranty and to direct that the Purchaser deal directly with such supplier or manufacturer. Hipotronics, Inc. agrees to assist the Purchaser in processing or settling any such claim without prejudicing its position as to liability.

WARRANTY CLAIM PROCEDURE Compliance with the following Warranty Claim Procedure is a condition precedent to the obligation of Hipotronics, Inc. under this Warranty:

(a) Purchaser must notify Hipotronics, Inc. in writing by certified or registered mail, of the defect claimed within twelve (12) months after date of original shipment. Said notice

WARRANTY

WARRANTY CLAIM PROCEDURE (cont'd)

shall describe in detail the defect, the defective part, and the alleged cause of defect; (b) at the exclusive option of Hipotronics, Inc., Purchaser shall dismantle or disassemble at Purchaser's cost and expense and shall ship the defective part or material prepaid to Hipotronics, Inc., Brewster, New York 10509, for inspection, or permit an authorized service representative of Hipotronics, Inc. to inspect the defective part or material at Purchaser's premises. If Hipotronics, Inc. shall inspect the part or material at the Purchaser's premises, Purchaser shall provide facilities for, and at Purchaser's cost and expense, dismantle, disassemble, or otherwise make accessible the subject part or material whether or not same is a component of or installed in a device other than that manufactured or supplied by Hipotronics, Inc. If disclosure shows that the defect is not one for which Hipotronics, Inc. is liable, the Purchaser agrees to reimburse Hipotronics, Inc. for all expense incurred; (c) upon receipt of the defective part or material, or after access to same, Hipotronics, Inc. shall inspect the part or material to determine the validity of Purchaser's claim.

The validity of any Warranty Claim, Purchaser's compliance with Hipotronics, Inc. Warranty Claim Procedure, the obligation to either repair, replace, or issue credit, or direct the purchaser to deal directly with a manufacturer or supplier are to be determined solely and exclusively by Hipotronics, Inc. and any determination so made shall be final and binding.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES EXPRESSE OR IMPLIED ON THE PART OF HIPOTRONICS, INC., INCLUDING THE WARRANTI OF MERCHANTIBILITY AND FITNESS FOR USE, AND CONSEQUENTIAL DAMAGES ARISING FROM ANY BREACH THEREOF AND HIPOTRONICS, INC. NEITHER ASSUMES NOR AUTHORIZES ANY OTHER PERSON, FIRM OR CORPORATION TO ASSUME ANY LIABILITY OR OBLIGATION IN CONNECTION WITH THIS SALE ON ITS BEHALF AND PURCHASER ACKNOWLEDGES THAT NO REPRESENTATIONS EXCEPT THOSE MADE HEREIN HAVE BEEN MADE TO PURCHASER.

9/17/71

JUN-17-1994 15:15 FROM HIPOTRONICS INC. TO P.01

DARLE 1 COPIA A LUIS RODRIGUEZ.

HIPOTRONICS
THE MEASURE OF A LEADER

HIPOTRONICS, INC.
A Subsidiary of Hubbell Incorporated
Route 22
P.O. Box 414
Brewster, NY 10509 U.S.A.
Tel: 914-279-8091 Fax: 914-279-2467

FACSIMILE TRANSMISSION COVER SHEET

COMPANY: U.T.E.	FAX NO:
ATTN: ING. J. FERREIRA	PHONE NO:
REF: 750-300 A.C TEST SET	DATE: 6-16-94
FROM: MIKE ADAMS	EXTENSION: 271

NUMBER OF PAGES INCLUDING COVER SHEET: 1

Please call as soon as possible if you do not receive all pages or they are illegible.

DEAR SIR:

I HAVE REVIEWED YOUR FAX AND SUGGEST YOU FOLLOW THIS PROCEDURE. FIRST YOU NEED TO DETERMINE WHERE THE ELECTRICAL CONNECTIONS ARE. IF THESE CONNECTIONS ARE ON THE TOP OF THE TANK YOU SHOULD UNBOLT THE HEADER .THEN LIFT THE UNIT OUT BY HOISTING UP THE HEADER.THIS WILL REMOVE THE COILS FROM THE OIL. AT THIS TIME YOU CAN REMOVE ALL THE OIL FROM THE TANK. AFTER ALL THE OIL IS OUT YOU SHOULD CHECK TO SEE IF THERE IS ANY FOREIGN MATTER IN THE TANK AND REMOVE IT.BEFORE LOWERING THE HEADER BACK ONTO THE TANK YOU SHOULD ALSO CHECK THE CORK GASKET TO MAKE SURE THAT IT WAS NOT DAMAGED UPON REMOVAL OF THE COILS BEFORE.IF THE CORK SEAL IS DAMAGED YOU MAY EITHER PURCHASE IT FROM US OR BUY IT WHERE YOU ARE.THE CORK SEAL HAS TO BE SUITABLE FOR TRANSFORMER OIL.BEFORE FILLING IT BACK YOU HAVE TO PULL A VACUUM ON THE TANK TO ABOUT.01 mmMg AND HOLD THIS VACUUM FOR A MINIMUM OF 6 HOURS.IF THE TANK HAS BEEN OPEN FOR A LONG TIME ,EXPOSING THE TANK TO MOISTURE AND ANY OTHER FOREIGN MATTER IT MUST HAVE TO BE VACUUM PROCESSED LONGER. WHEN YOU HAVE COMPLETED THIS STEP YOU MUST THEN REFILL THE OIL INTO THE TANK WHILE IT IS UNDER VACUUM. YOU SHOULD FILL THE TANK LEAVING A 6% AIR GAPE AT THE TOP OF THE TANK.WHEN YOU REACH THIS POINT THEN YOU CAN RELEASE THE VACUUM WITH AIR (DO NOT USE NITROGEN). IF YOU NEED ANY MORE ASSISTANCE FEEL FREE TO FAX ME HERE.

BEST REGARDS,
Michael J. Adams

CC:

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-30-

JUN-20-1994 17:28 FROM HIPOTRONICS INC. TO P.01

Atención: Hector Montaño
Antony Beaumont

DATE: JUNE 20, 1994

De: Jorge Ferreira
GF

HIPOTRONICS
THE MEASURE OF A LEADER

HUBBELL

HIPOTRONICS, INC.
A Subsidiary of Hubbell Incorporated
Route 22
P.O. Box 414
Brewster, NY 10509 U.S.A.
Tel: 914-279-8091 Fax: 914-279-2467

FACSIMILE TRANSMISSION COVER SHEET
FACSIMILE NO. 914-279-2467

COMPANY:	UTE	TELECOPY NO:	59 82 28 29 91
ATTN:	ING. J. FERREIRA	PHONE NO:	
REF:	MODEL 750-300		
FROM:	TOM GRAYSON	EXTENSION:	351
NUMBER OF PAGES INCLUDING COVER SHEET:	1		

Please call as soon as possible if you do not receive all pages or they are illegible.

Yes, you can remove the top cover for inspection with minimum disturbance to components. Your procedure sounds fine, but I would stress that you should maintain the vacuum while filling with oil. We should have said it is not necessary to use nitrogen but you may if you choose.
I would say that your procedure looks fine. I would however suggest that you test the existing oil prior to performing this work, (perhaps you already have).
Good luck!

Regards,

Tom Grayson

CC:

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